WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a chip;

a plurality of bonding pads provided on said chip;

a plurality of inner leads arranged opposite to said bonding pads; and

a plurality of bonding wires electrically connecting said bonding pads and the corresponding inner leads, respectively;

wherein each of said bonding wires has a plurality of bends electrically isolated from conductive parts on said chip, and said bonding pads are arranged at optional positions on a surface of said chip.

2. The semiconductor device according to claim 1, wherein said bends are apart form said chip and are electrically insulated from conductive parts on said chip.

3. The semiconductor device according to claim 1, wherein said chip is provided on its surface with electrically insulating parts, and at least one of said plurality of bends is in contact with said electrically insulating part of said chip so as to be insulated from the conductive parts of said chip.

4. The semiconductor device according to claim 1, wherein said chip and said plurality of inner leads are sealed in a sealing resin package, and said bonding wires are sealed in said sealing resin package such that at least one of said plurality of bends is exposed on a surface of said sealing resin package.

5. The semiconductor device according to claim 1, wherein the nearest bend to said inner lead among said plurality of bends of each bonding wire is located at a position at a distance from a limit on the side of the corresponding inner lead of a range extending over said chip toward the corresponding inner lead.

6. The semiconductor device according to claim 1, wherein the nearest bend to the corresponding inner lead among said plurality of bends of each bonding wire is at a level higher than that of the nearest bend to said chip.

7. A wire bonding apparatus to be used for fabricating the semiconductor device defined in claim 1.

8. The wire bonding apparatus according to claim 7, wherein said bends are apart form said chip and are electrically insulated from conductive parts on said chip.

9. The wire bonding apparatus according to claim 7, wherein said chip is provided on its surface with electrically insulating parts, and at least one of said plurality of bends is in contact with said electrically insulating part of said chip so as to be insulated from the conductive parts of said chip.

10. The wire bonding apparatus according to claim 7, wherein the nearest bend to said inner lead among said plurality of bends of each bonding wire is located at a position at a distance from a limit on the side of the corresponding inner lead of a range extending over said

chip toward the corresponding inner lead.

11. The wire bonding apparatus according to claim 7, wherein the nearest bend to the corresponding inner lead among said plurality of bends of each bonding wire is at a level higher than that of the nearest bend to said chip.

Claims 12-20 OK for 228/180.5. KS 1-13-02

12. A wire bonding method apparatus for electrically interconnecting a plurality of bonding pads arranged on a chip, and a plurality of inner leads arranged on a leadframe by bonding wires, said wire bonding apparatus being configured to:

set respective ratios of distances between said bonding pad and bends to be formed in each bonding wire to an overall length of said bonding wire between said bonding pad and said inner lead as viewed from above a major surface of said chip; and

form said plurality of bends electrically insulated from conductive parts on said chip at positions corresponding to said ratios.

13. The wire bonding apparatus according to claim 12, wherein data on an error in the position of each bend is held, and the overall length of said bonding wire is corrected according to said data on the error in the position of each bend.

14. The wire bonding apparatus according to claim 13, wherein the correction of the overall length of said bonding wire is achieved by adding an absolute value of the error in the position of each bend to or subtracting an absolute value of the error in the position of each

bend from the overall length of said bonding wire.

15. The wire bonding apparatus according to claim 13, wherein the correction of the overall length of said bonding wire is achieved by adding a value obtained by dividing the error in the position of each bend by the ratio of the distance between said bonding pad and said bend to or subtracting a value obtained by dividing the error in the position of each bend by the ratio of the distance between said bonding pad and said bend from the overall length of the bonding wire.

16. The wire bonding apparatus according to claim 12, wherein a length of a segment between said bonding pad and an edge on the side of said inner lead of said bonding wire as viewed from above a major surface of said chip is calculated before forming said plurality of bends.

17. The wire bonding apparatus according to claim 16, wherein the length of the segment extending over said chip of said bonding wire is calculated on the basis of a size of said chip as viewed from above the major surface of said chip, and coordinates of opposite ends of said bonding wire as viewed from above the major surface of said chip.

18. The wire bonding apparatus according to claim 16, the wire bonding apparatus includes a position detector for measuring position of said chip on a die pad included in said leadframe, wherein a calculated length of the segment extending over said chip of said bonding wire is adjusted on the basis of an error in the position of

said chip measured by the position detector.

19. The wire bonding apparatus according to claim 16, wherein a set value for the length of the segment extending over said chip of said bonding wire is determined beforehand, a direction in which said bonding wire is to be drawn is determined on the basis of comparison between the calculated length of the segment extending over said chip of said bonding wire and said set value.

20. The wire bonding apparatus according to claim 12, wherein said bonding wire is shaped such that said bonding pads can be disposed at optional positions on the surface of said chip.